DOCUMENT RESUME

ED 409 658 EA 028 523

AUTHOR	Dudderar, Glenn R.; And Others
TITLE	School Ground Habitat for People and Wildlife. Extension Bulletin E-2583.
INSTITUTION	Michigan State Univ., East Lansing. Cooperative Extension Service.
SPONS AGENCY	Forest Service (USDA), Washington, DC.; Michigan State Dept. of Natural Resources, Lansing.
PUB DATE	Sep 96
NOTE	33p.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Ecology; *Educational Facilities Design; *Educational Facilities Planning; Elementary Secondary Education; Environmental Education; Floriculture; Habitats; *Landscaping; Natural Resources; Nature Centers; *Physical Environment; *Site Development; *Wildlife
IDENTIFIERS	*Michigan

ABSTRACT

The interrelationships among living things and their physical environment are usually numerous and complex. Benefits to animals may be in terms of survival, growth, and reproduction; to humans, greater appreciation and accumulation of wealth. This guidebook shows how school grounds can be managed to increase opportunities for improved instruction and appreciation of the environment. Section 1 offers tips for creating plant patterns that benefit people and create wildlife habitats, discusses the importance of protecting and enhancing existing natural areas, and explains the features of other special projects. One table describes which locations, kinds of plants, and patterns will achieve certain results; another table provides examples of wildlife habitat components and the wildlife that use them. Section 2 describes stages in getting started, including suggestions for developing a planning and implementation committee. The third section provides suggestions for evaluating existing grounds, planning, prioritizing, scheduling, and budgeting. Tips for obtaining materials, equipment, and funding are offered in section 4. The fifth and sixth sections describe ideas for ensuring project continuity and for using the natural area/wildlife habitat for educational purposes. A table identifies ways to evaluate and measure outcomes, using appropriate materials and methods. Lists of resource organizations in Michigan and related literature are included. Three tables and 10 figures are included. (LMI)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 409 658

SCHOOL GROUND HABITAT

FOR PEOPLE AND WILDLIFE

Extension Bulletin E-2583 • September 1996

By
Glenn R. Dudderar, Denise Wecker-Seipke,
Dale K. Elshoff, Shari L. Dann and Cara A. Boucher

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

EA 028 523

MICHIGAN STATE UNIVERSITY EXTENSION

This publication was supported in part by a grant from
the Michigan Department of Natural Resources Forest Management Division
and the U.S. Department of Agriculture Forest Service State and Private Forestry Program.

Table of Contents

Section I
Introduction 2
Things You Should Know Before You Start 2
Protect and Enhance Existing Natural Areas 11
Other Special Projects 13

Section II
Getting Started 17

Section III
Implementation: Evaluate Your School Ground 19
Make a Plan 20
Share Your Plan 21
Prioritize, Schedule and Budget 21

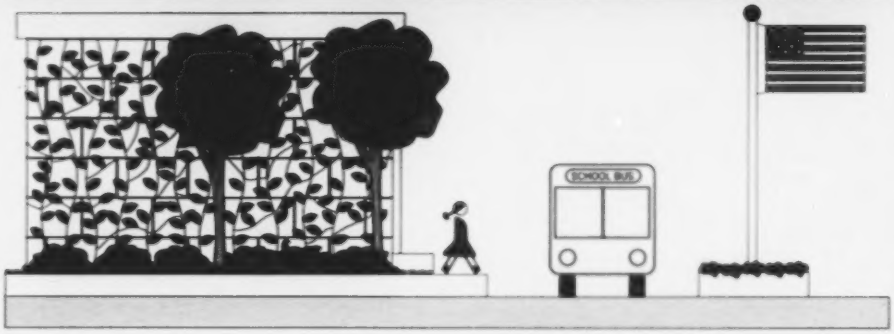
Section IV
Obtaining Materials, Equipment and Funding 22

Section V
Provide for Continuity 24

Section VI
Using Your Natural Area/Wildlife Habitat for Education 25

Section VII
Local Resources 27
Helpful Literature 28
Technical and Financial Support 29

SCHOOL GROUND HABITAT



FOR PEOPLE AND WILDLIFE

Glenn Dudderar, Associate Professor
and Extension Wildlife Specialist,
Department of Fisheries and Wildlife, MSU

Denise W. Seipke, Executive Director,
Greening of Detroit

Dale K. Elshoff, Project Wild Coordinator,
Department of Agricultural and Extension Education, MSU

Shari L. Dann, Assistant Professor and Extension 4-H Specialist,
Department of Fisheries and Wildlife, MSU

Cara Boucher, Urban and Community Forester,
Forest Management Division,
Michigan Department of Natural Resources

Introduction

The interrelationships among living things and their physical environment are usually numerous and complex. This abundance and complexity provide organisms, especially humans, with a wealth of opportunities to prosper. Benefits to animals may be in terms of survival, growth and reproduction; to humans, greater appreciation and accumulation of wealth.

The following information will help you understand how your school grounds can be managed to increase opportunities for improved instruction and appreciation, understanding and enjoyment of the environment. At the same time, costs of school operation will be reduced. Objectives, plans, methods and evaluation are also described.

Any change usually has both advantages and disadvantages, and people frequently disagree about what is advantageous or disadvantageous. In addition, some people object to any change, regardless of the benefits, and some people are vandals. The following information describes methods that help resolve to some degree these sources of conflict.

The goal of this material is to provide teachers with an opportunity to help students better understand their relationship with their environment, each other and their community. The process of creating and maintaining that opportunity will also allow students to implement their skills and knowledge in improving their environment to provide multiple interrelated benefits.

Things You Should Know Before You Start

If you want to create wildlife habitat or maintain a natural area on school grounds or other properties intensively used by people, it is essential to select sites, plants and plant patterns that benefit the people who own, use and maintain the buildings and grounds. Natural areas and wildlife habitat that enhance a school's use, maintenance, enjoyment and instructional value will very likely be appreciated and protected. Habitat that does not provide such enhancement will eventually be eliminated by design, accident or neglect.

Plant Patterns Can Benefit People and Create Wildlife Habitat

- Windbreaks of trees and/or shrubs reduce building heating costs by up to 40 percent and enhance people's comfort outside by reducing wind speed and wind chill (Fig. 1).
- Shade trees reduce building temperatures or lower cooling costs by up to 15 percent. They enhance the enjoyment of school grounds by reducing light intensity and summer temperatures (Fig. 2).
- Rows of plants screen glare, noise, dust and visual distractions (Fig. 3).
- Rows and masses of plants that create barriers that separate children from hazards such as vehicle traffic, industrial sites, etc. (Fig. 3).
- Rows and masses of plants create barriers that direct foot traffic and prevent trampling that creates muddy, dusty and icy spots (Fig. 4).
- Rows and masses of plants reduce the amount and cost of mowing, leaf removal, snow removal and lawn chemicals (fertilizer, herbicides, insecticides) (Figs. 3-6).
- Filter strips of plants reduce the pollution and eutrophication (overenrichment) of streams, ponds and lakes (Fig. 7).
- Artistic and creative placement of appropriate plants improves the appearance of buildings and grounds (Figs. 8 and 9).
- A variety of plant types and plant groups attracts a variety of animals. This variety creates greater opportunity for learning about and enjoying a diversity of living organisms, communities and their interrelationships (biodiversity).

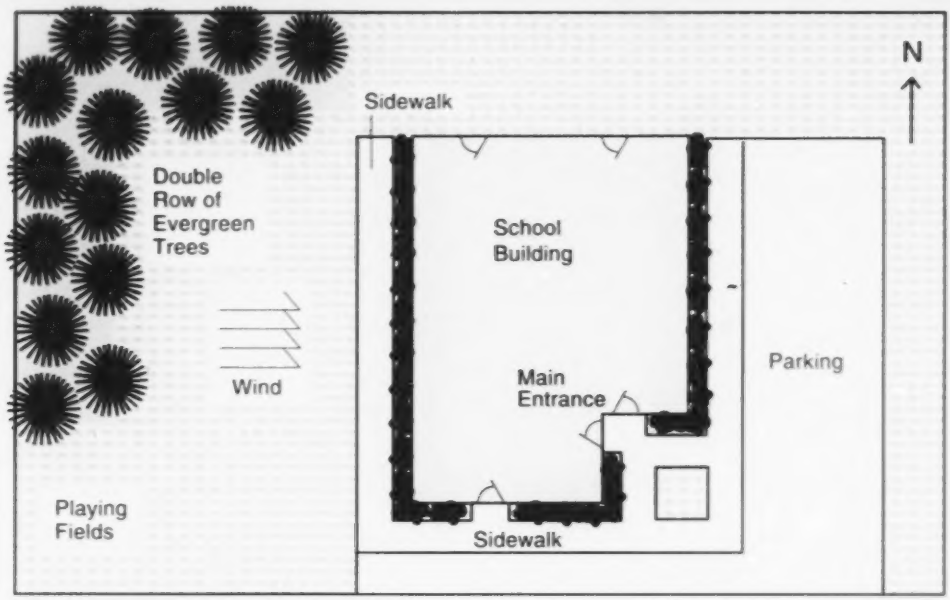


Figure 1. Windbreaks reduce wind chill and heating costs.

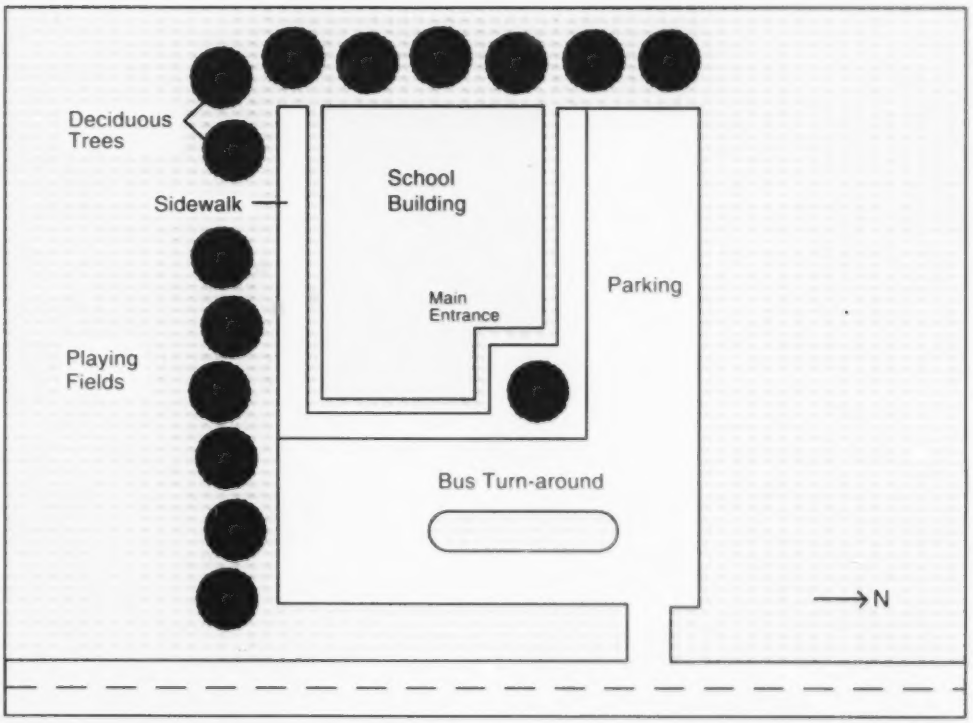


Figure 2. Deciduous trees provide shade for school from the south and west.

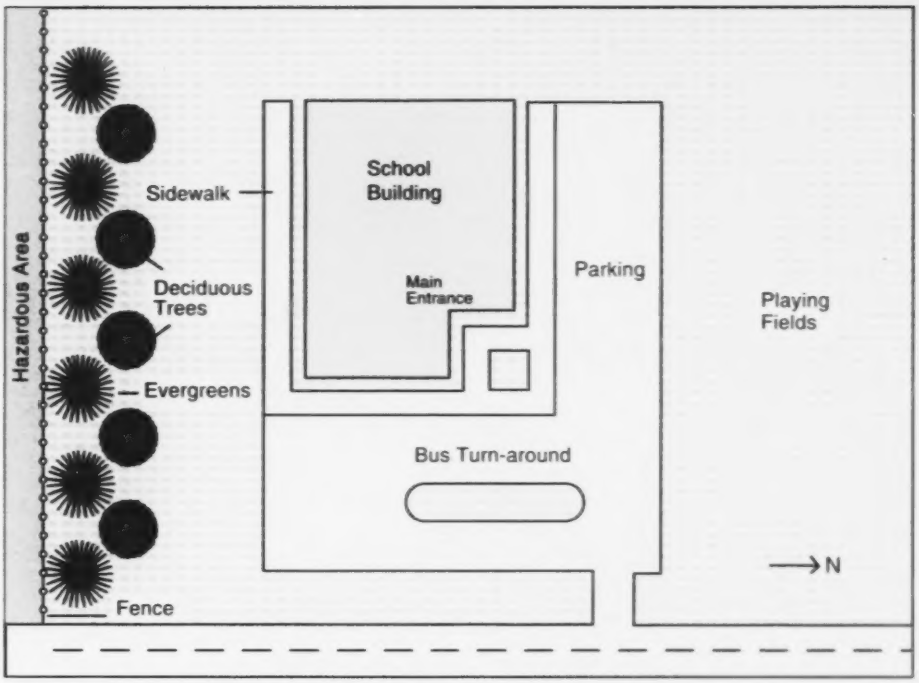


Figure 3. Trees provide a visual and noise barrier to screen school grounds from railroads, highways, industrial areas, etc.

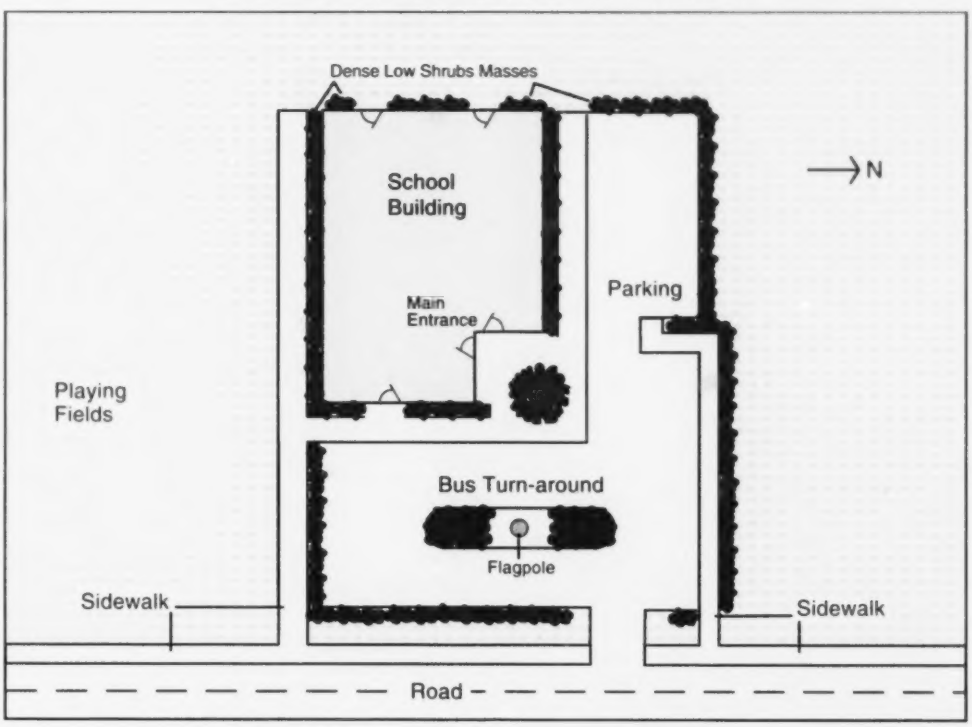


Figure 4. Low shrubs direct foot traffic, improve safety and reduce trampling.

BEST COPY AVAILABLE

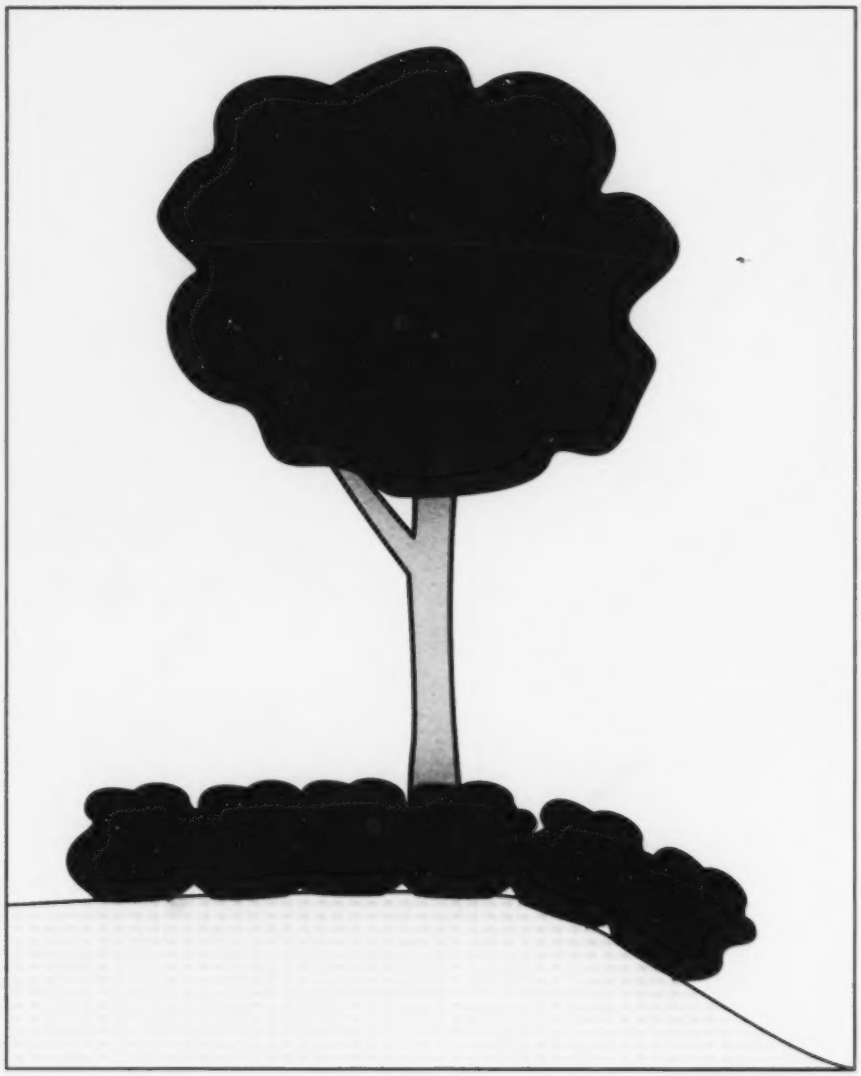


Figure 5. Shrubs reduce the need for leaf removal.

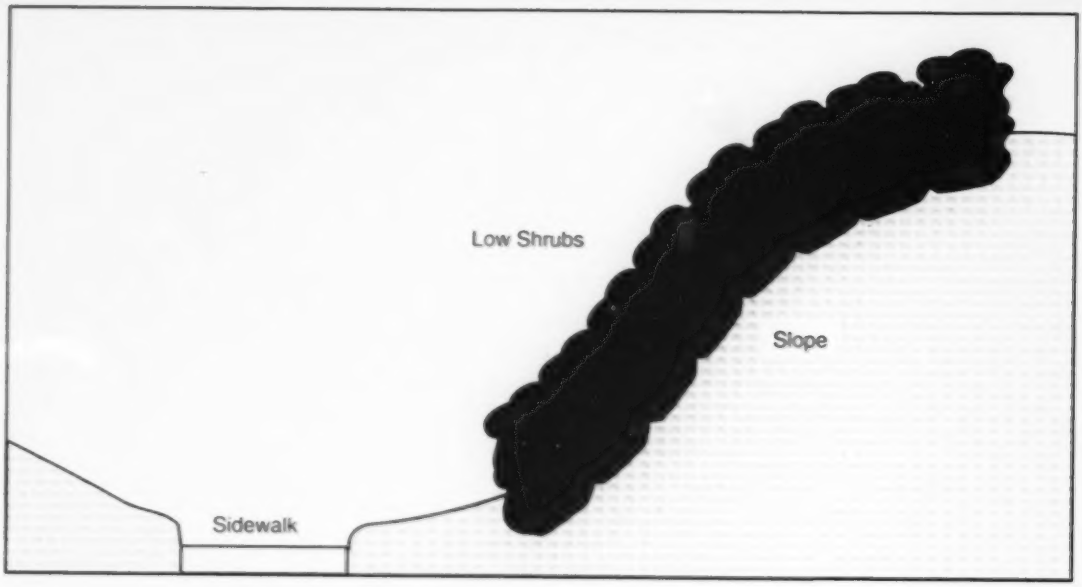


Figure 6. Avoid mowing on a slope by planting low shrubs.

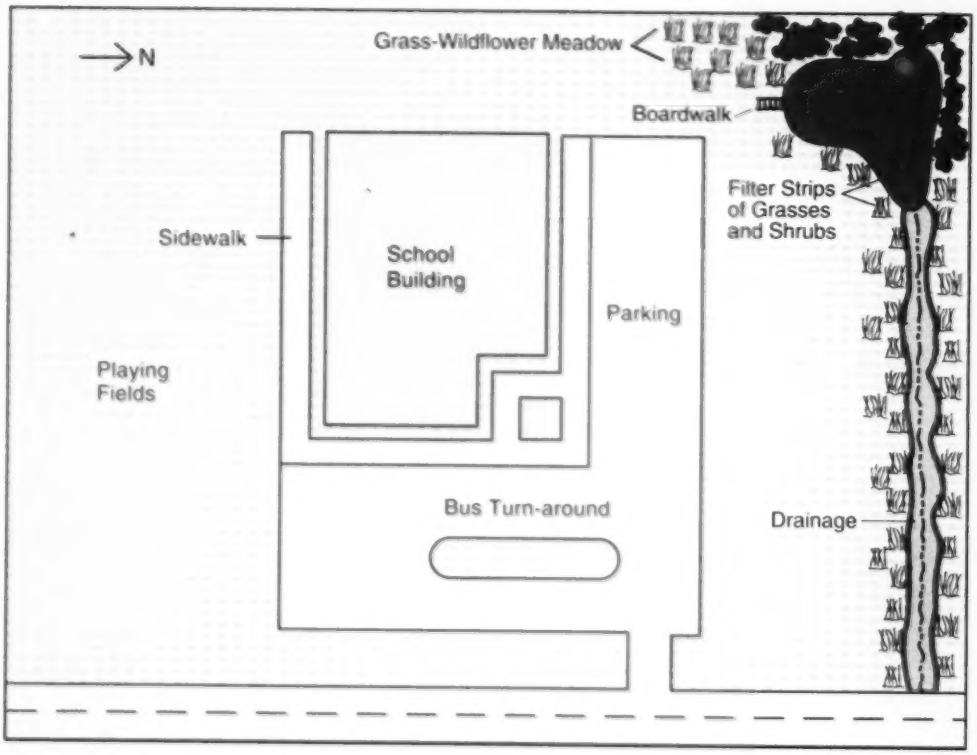


Figure 7. Plantings can protect and enhance meadows and wetlands.

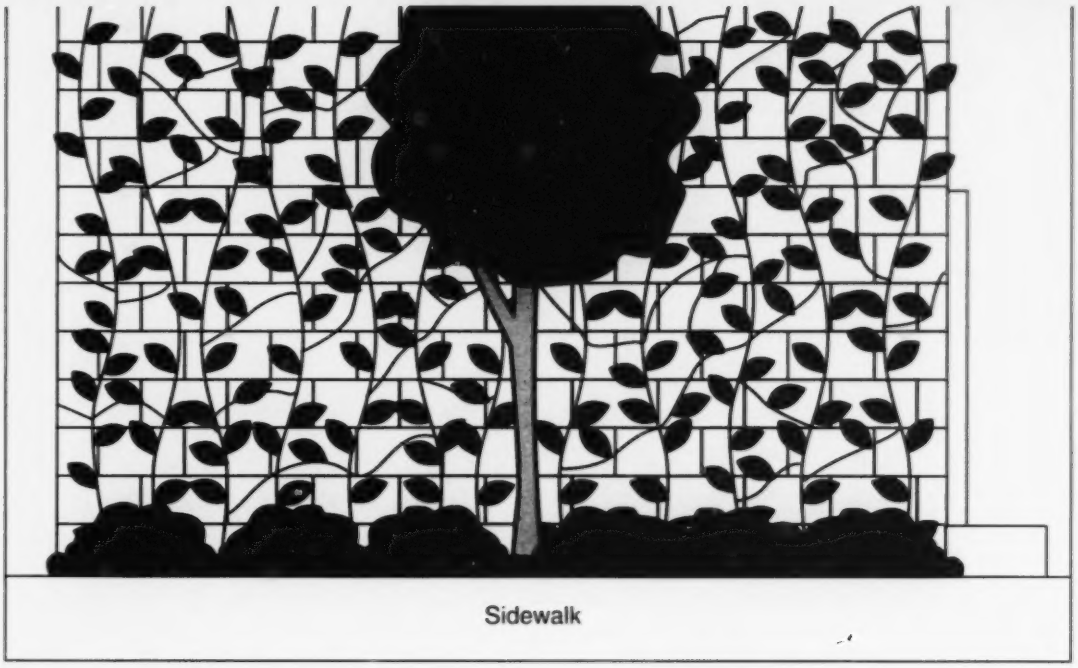


Figure 8. Plants can enhance the appearance of walls with no windows.

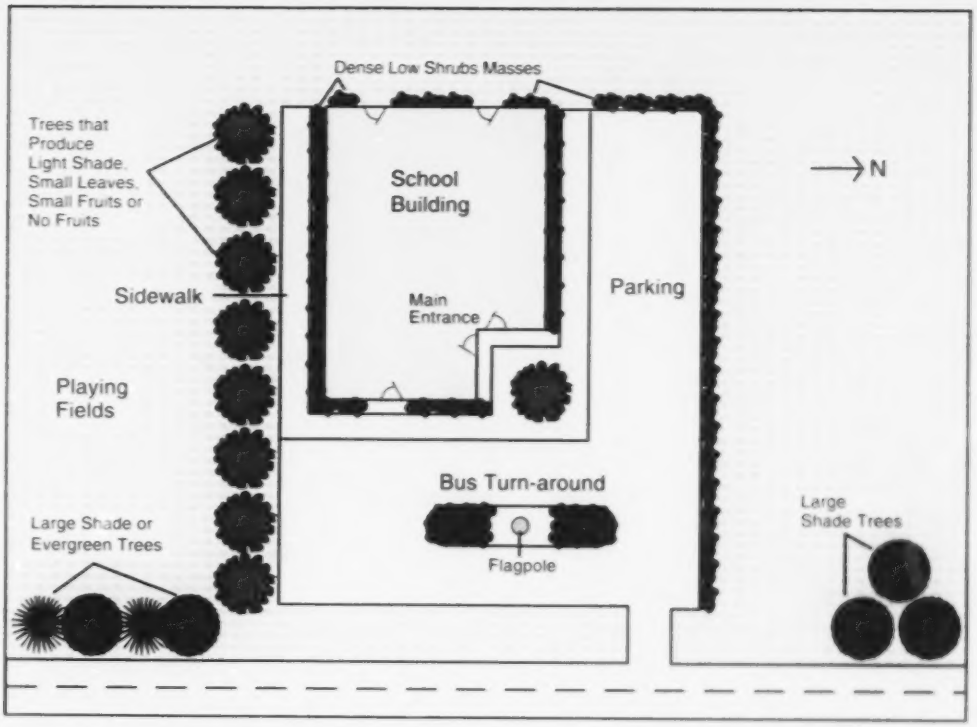


Figure 9. Trees and shrubs can improve the overall appearance of school grounds.

Avoid Creating Problems When You Design Your Wildlife Habitat

If inappropriate plants are planted or allowed to grow in inappropriate places or patterns, they will add little value and may create serious problems. Because the wrong kind of plant in the wrong place is such a common problem, many people think that the only reasonable choice of vegetation around schools is mowed grass. It is obvious from the preceding list of benefits that additional varieties of plants and plant patterns are equally or even more appropriate in school yards if certain problems are avoided.

You can avoid problems for your school grounds and wildlife habitat project if you remember the following:

- Never plant fruit, nut or cone-bearing trees where the fruits, nuts or cones will litter sidewalks, roadways or other areas receiving heavy foot traffic. NOTE: Many species and varieties of trees produce few or no seeds, or small seeds easily swept or blown away.
- Never plant shrubs that grow more than 3 feet tall near doorways or walkways or anywhere they would obstruct views important to security. Tall shrubs near these areas provide concealment for undesirable human behavior. NOTE: Low-growing shrubs (under 3 feet tall) do not provide such concealment. Densely growing low shrubs actually discourage undesirable behavior, especially if they have thorns.
- Never plant evergreen trees that retain their lower branches (e.g., spruces, firs) near doorways, walkways or anywhere they would obstruct views important to security.
- Many plants cannot tolerate salt, especially evergreens. Never plant salt-intolerant plants adjacent to sidewalks or roadways where they will be splashed by salt applied during the winter.
- Plants growing below a window should be a low-growing variety that reaches no higher than the windowsill. Pruning or trimming will not be necessary to clear the view, and cleaning done from the outside will not be hampered.
- Keep driveway entrances or intersections clear of anything that blocks the view of oncoming traffic.
- Be careful when planting or allowing tall grasses to grow immediately adjacent to buildings and walkways. In these locations, tall herbaceous vegetation can be a nuisance and a fire hazard.
- Avoid or eliminate plants that grow over the edge of a sidewalk or roadway. Properly placed wayside plants with compact and/or non-sprawling growth form will not require annual pruning or substantially interfere with snow removal and storage.
- Never plant trees with roots that invade water conduits near water, sewer and septic lines (e.g., maples, poplars, cottonwoods).
- Avoid planting species of non-native plants that spread from their planting site and outcompete and dominate our native plant communities (examples: purple loosestrife, buckthorn, multiflora rose, Siberian elm, autumn olive).
- Plant species that are resistant to disease, insects and weather. Avoid plants that require high maintenance or frequent replacement (e.g., boxelder, Lombardy poplar, crabapple not resistant to rust and blight).

After reading the above, it may appear that plants on school grounds can create problems, but the opposite is true if the right plants are planted or allowed to grow in the right place.

Table 1 suggests plants, plant patterns and planting sites that produce benefits for people.

Table 1. Planting sites, plants, plant patterns and their benefits.

To achieve these benefits	Plant these sites	Plant in these patterns	Plant these general categories of plants
wind reduction	areas northwest, west and southwest of buildings, playing fields, athletic courts	single or double rows	evergreen trees that retain their lower branches (spruces, firs, cedars, white pine) or two rows of evergreen shrubs and deciduous trees
shade	areas south and southwest of buildings and parking lots or by courtyards, entranceways, walkways, driveways	individually spaced to produce shade where desired	tall deciduous trees such as maples, locusts, ashes, basswoods; where fallen nuts are not a problem – oaks, hickories, walnuts
reduced glare, noise, dust, etc.	along roads, railroads, property boundaries	single or multiple rows	evergreens, trees, especially those that retain their lower branches (spruces, firs and white cedar) or evergreen and deciduous shrubs
reduced trampling, erosion control, foot traffic control	slopes, areas between sidewalks and buildings, around doorways, in quadrangles and school bus circles	masses	low-growing evergreen or deciduous shrubs such as junipers, cotoneaster, flowering quince or ground covers that can be protected from trampling until they get established
reduced leaf removal	under deciduous trees	bands encircling tree trunks	shrubs or ground covers that tolerate partial shade (arrowwood viburnum, nannyberry); small-leafed trees also reduce leaf removal (honeylocust)
reduced mowing	areas that are not used for any activity except mowing and do not need to be in mowed lawn for vistas or security reasons	masses	tall grass, trees, shrubs
snow removal	along walks and roads	rows perpendicular to wind (block wind to reduce leeward snow deposition) or rows parallel to wind (accelerate wind to reduce snow deposition)	evergreen trees or shrubs
water pollution control	edges of ponds, lakes, streams, rivers	masses in strips	tall grasses
aesthetic enhancement	courtyards, corners, around signs	small groups, single plants	trees, shrubs, perennials and bulbs
aesthetic enhancement	walls with no windows, doors, signs	climbing vines, columnar trees	ivies, creepers, etc.; white cedars, poplars, etc.

Protect and Enhance Existing Natural Areas—Wetlands, Meadows, Prairies and Woodlands

Many school grounds, especially around suburban and rural schools, already have meadows, wetlands and woodlands. These natural areas should be protected, enhanced and interpreted. (Note: Protected does not mean preserved untouched. Proper tree cutting, for example, can help a forest continue to regrow or keep it healthy, while unregulated human traffic can severely damage a woods.)

Protect meadows from refuse dumping, excessive random foot traffic, vehicles and regular mowing. Enhance meadows by planting native grasses and wildflowers. Create meadows by allowing grass to grow. Meadows, however, must be mowed, lightly disked or burned once every three to five years to prevent them from eventually becoming woodlands (Fig. 7).

Protect wetlands from refuse dumping, siltation and changes in hydrology caused by drainage, filling or permanent alterations in water flow. Maintain bordering buffer zones of tall grass. Restore wetlands by creating or maintaining year-round shallow water and by regulating seasonal water depth with an inexpensive water control structure. Always check with state agencies before altering any wetland (Fig. 7).

Protect woodlands from vandalism to trees, refuse dumping and excessive random foot traffic. Enhance woodlands by thinning, cutting and planting. The health and vigor of the trees in most deciduous and evergreen forests can be improved by thinning. In addition, thinning in mixed species hardwood forests can be done to favor trees most important to wildlife by removing less beneficial trees. Trees most beneficial to wildlife include oaks, hickories, beeches, walnuts, hackberries, cherries, locusts and ironwood. In forests of aspen and birch, it is often necessary to clear-cut old stands to renew them. Many wildlife species prefer mixtures of young and old aspen stands. A woodlot can also be created by planting an appropriate site with tree seedlings adapted to the site. Planting in an existing woodlot is only worthwhile when done along woodland edges or in woodland openings where competition for light, water and nutrients is less severe (Fig. 10).

All of these areas can be interpreted by creating trails and/or boardwalks for access and by developing site-specific educational materials. Local and state professionals are usually willing to provide at least expert advice on management and interpretation.

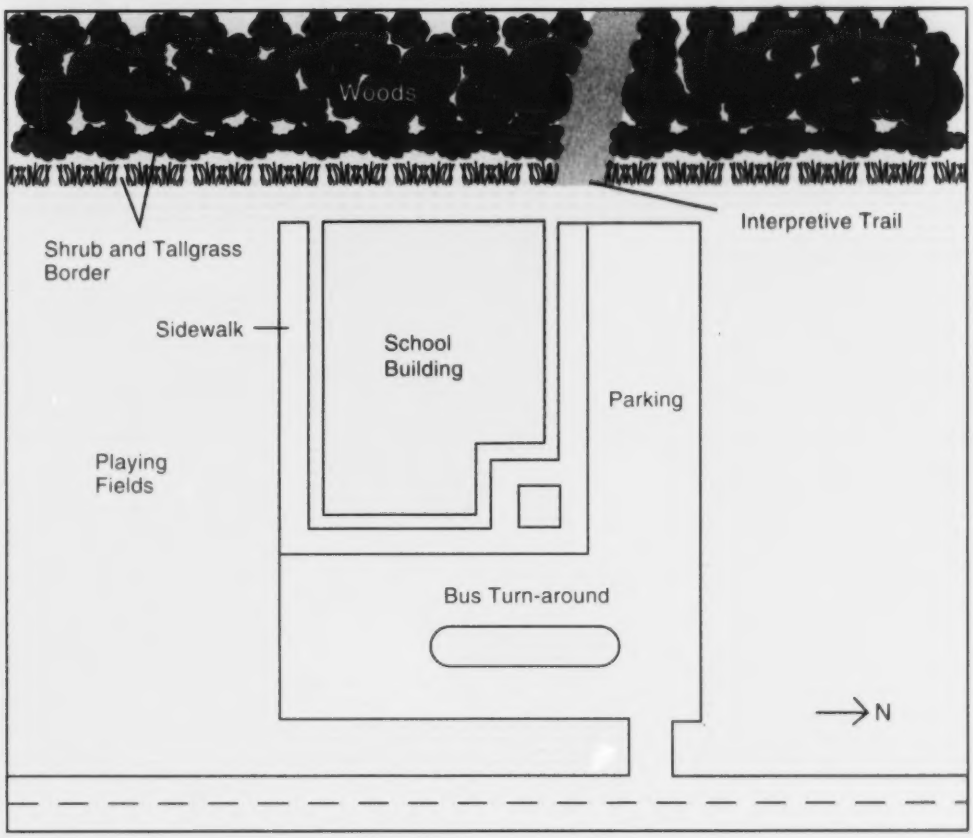


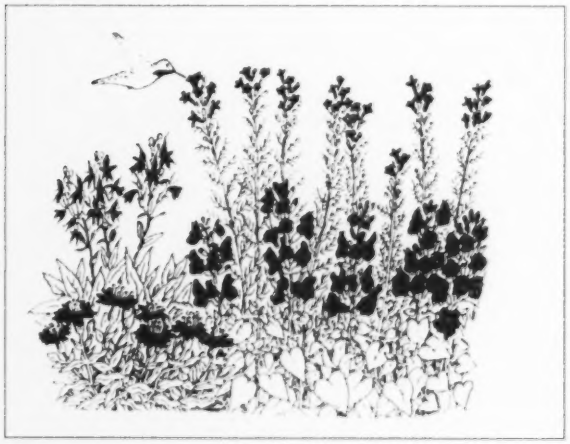
Figure 10. Protection and enhancement of woodlots.

Other Special Projects

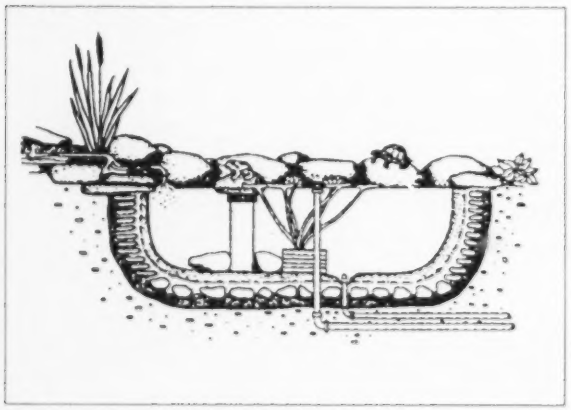
The following special projects are appealing, but each has distinct disadvantages. Consider them carefully before selecting them:

■ **Raised annual flower beds** — high initial cost; require annual intensive maintenance; most attractive during summer when students are not at school; easily vandalized.

■ **Butterfly and hummingbird perennial flower gardens** — same as above, except that late summer and fall blooming flowers are in full bloom at the start of school and may attract butterflies and hummingbirds until the onset of cold weather.



■ **Artificial pools** — require intensive management to avoid problems of stagnant water, algal blooms and mosquito production; someone usually adds goldfish, which eliminate aquatic invertebrates and intensify the algal blooms.

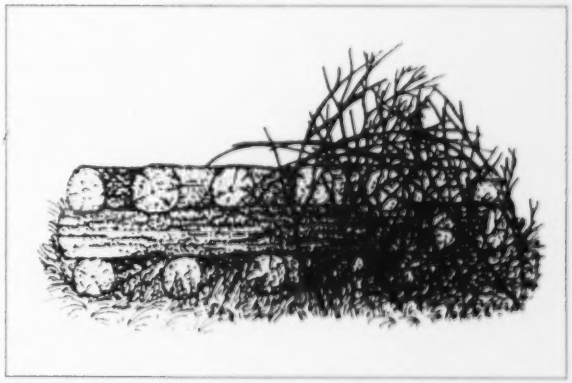


■ **Ponds** — expensive to build; may be a liability problem. Shallow water impoundments less than 3 feet deep are less expensive and less hazardous and attract a great variety of invertebrate and vertebrate life. Because of the variety of life in the water, mosquitoes are rarely a problem.

■ **Artificial nesting structures** (bird nest boxes, waterfowl nest platforms, etc.) — must be placed properly and maintained annually. Nest boxes placed correctly and maintained properly, however, may provide opportunities for observation and instruction not normally available.

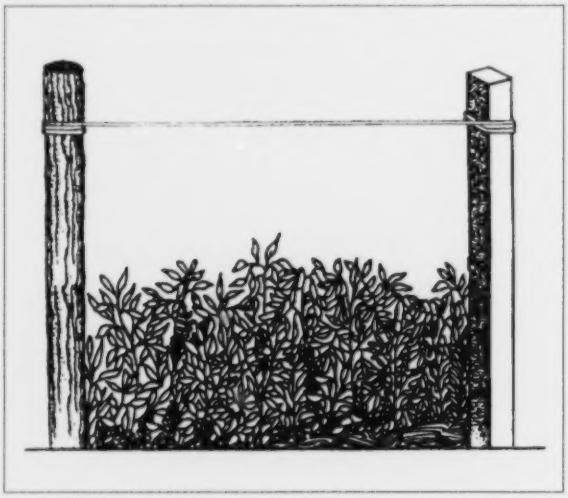
■ **Bird feeders** — must be filled regularly and cleaned when necessary; spilled seed and seed hulls should be cleaned up as needed. If properly maintained, however, and placed near enough to classroom windows where they can be observed but far enough away to reduce bird-window collisions, feeders create excellent opportunities for study.

■ **Brush piles** — appearance may be unacceptable; many brush piles may help too many rabbits survive the winter (rabbits eat young plants); loose, open brush piles are used by nesting birds; brush piles with large material on the bottom and dense fine material or top are excellent winter cover.



■ **Food plots** — annual food plots (corn, sorghum, etc.) are costly in time and money; perennial food plots of clover attract a variety of wildlife for far less cost.

■ **Bird-planted food plots** — clotheslines suspended over lightly loosened soil will result in a wide variety of plants growing beneath the line. Unfortunately, many plants may be considered highly undesirable weeds.



■ **Snake hibernaculums** — an excellent but often unpopular idea; unwise when near massasauga rattlesnake habitat (hundreds of acres of wetland); very attractive to harmless snakes that can be readily observed spring and fall, sometimes in large numbers.

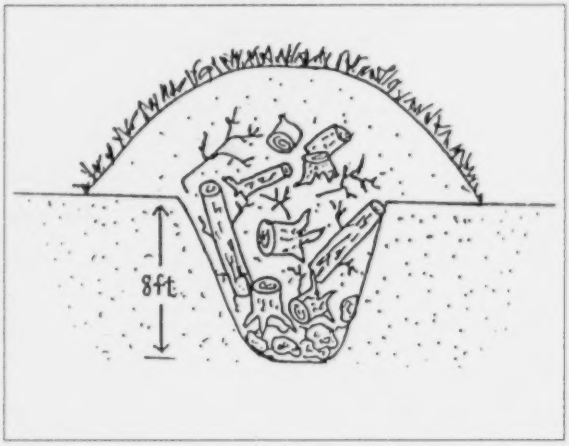


Table 2. Examples of wildlife habitat components and the wildlife* that use them.

Habitat component	Examples of wildlife that use each habitat component
mowed grass with widely spaced, well pruned deciduous and evergreen trees and shrubs	spring and summer nesting and feeding by robins, mourning doves, grackles, killdeer and chipping sparrows; year-round use by moles and 13-lined ground squirrels
dense, unmowed grass	nesting by red-winged blackbirds, grasshopper sparrows; year-round use by small mammals such as moles, shrews, meadow voles, weasels, rabbits
unmowed grass and broadleafed herbaceous plants of varying density with scattered shrubs	spring and summer nesting and feeding by kingbirds, meadowlarks, bobolinks, vesper and field sparrows, woodcocks, pheasants, kestrels, goldfinches (bluebirds and tree swallows with nest boxes); and year-round use by small mammals such as rabbits, foxes, skunks, weasels, woodchucks, voles, mice and shrews
masses of shrubs in lawns	spring and summer nesting by song sparrows, catbirds, wrens (with nest boxes), robins; year-round use by cardinals
masses of shrubs in unmowed grass or along woodland edges	spring and summer nesting by indigo buntings, thrashers, goldfinches, cuckoos, flycatchers, cardinals, bobwhites, housewrens, catbirds, blue-winged and chestnut-sided warblers; year-round use by mammals such as deer mice, rabbits, weasels, foxes and deer
large deciduous trees in lawns	spring and summer nesting and feeding by titmice, doves, robins and orioles; year-round use by downy woodpeckers and flickers and by small mammals such as raccoons, opossums, and gray, red and flying squirrels; spring and summer roosting by red bats
large evergreen trees in lawns	spring and summer nesting by mourning doves, robins, grackles, chipping sparrows; winter cover use by a variety of birds and small mammals, especially if the lower branches are not pruned; year-round use by red squirrels
dry woodlands of large deciduous trees	many birds — red-tailed, red-shouldered and Cooper's hawks; owls, whippoorwills, turkeys, woodpeckers, pewees and phoebes, flycatchers, jays, crows, titmice, chickadees, nuthatches, creepers, thrushes, most warblers, redstarts, ovenbirds and scarlet tanagers; many mammals — squirrels, deer, bears, opossums, raccoons, porcupines, white-footed mice, chipmunks — and most snakes
dry woodlands of young deciduous trees	many birds — woodcock, grouse, flycatchers, vireos, redstarts, towhees; mammals such as deer and snowshoe hares; summer use by porcupines; winter use by coyotes
dry evergreen woodlands	pine warblers, hermit thrushes, red-breasted nuthatches; nesting by Cooper's hawks, red squirrels and porcupines
deciduous swamps	blue-gray gnatcatchers, warbling vireos, titmice, wood ducks, ruby-throated hummingbirds, turkey vultures, yellow warblers, cedar waxwings, common yellow throats, beavers, snowshoe hares, deer, mink, bears, woodchucks, raccoons, muskrats, opossums, bats, skunks
evergreen swamps	Nashville warblers, golden-crowned kinglets, barred owls, red-breasted nuthatches, red squirrels, deer, snowshoe hares, bears
marshes	herons, mallards, Canada geese, harriers, kingfishers, sedge wrens, red-winged blackbirds, black terns, snipe, rails, sandhill cranes, swamp sparrows, muskrats, mink, opossums and skunks
primarily manmade structures: windowsills, barn rafters, roofs and cornices	nesting by doves and pigeons, nighthawks, swifts, barn swallows, robins, house sparrows and bats

*Consult field guides or references on Michigan birds, mammals, reptiles and amphibians for occurrence (range) in Michigan.

18 BEST COPY AVAILABLE

Maintenance Reduction on School Grounds

Most people believe that mowed lawn is the easiest and cheapest plant community to create and maintain. If you consider establishment, maintenance and mowing costs, you should be suspicious of this common belief. The establishment of an alternative plant community may be more or less costly than lawn establishment, but it will be easier and cheaper to maintain if it's done properly. The following tips help reduce or eliminate maintenance:

■ Reread the section on how to avoid creating problems (p. 9).

■ When planting trees, put at least 3 to 4 inches of mulch (wood chips, shredded bark) around the tree in a band at least 3 feet wide to conserve soil moisture and reduce grass and weed growth. You may want to place a weed mat on the planting site after the tree is planted and then add the mulch. The mat and mulch will eliminate the need to mow around the tree, thus protecting the tree trunk from mower damage and reducing the number of weeds and tall grasses growing around the tree. Any grass or weeds that do grow can be easily pulled or killed with herbicide. Add new mulch every 2 to 3 years or as needed. Wood chips and bark can usually be obtained free and in large quantities from local government agencies, road commissions, power companies and forest industries.

■ In most cases, you will want to put plastic tubes around the trunks of newly planted trees. Special plastic tubes are commercially available that help accelerate tree growth and protect the tree trunk from rabbits, deer, mice, weed cutters and lawn mowers. Flexible, perforated plastic drain pipe can also be used to protect woody plants. Cut to length needed and slice lengthwise to open.

■ Whenever planting small areas in rows or masses of shrubs or ground cover plants, cover the area between plants with weed mats and then cover the mats with wood chips or shredded bark. Small areas can also be covered with plastic sheeting, but plastic sheeting may exclude too much moisture, especially over a large area. This process will eliminate or at least reduce the number of weeds growing in the planting until the planting becomes well established. Any weeds that do appear can be quickly and easily pulled or killed by herbicide. Wood chips and bark are usually available free and in quantity from local governments, road commissions, power companies and wood-using industries.

When large areas are planted with shrubs and/or trees, annual weed control around the plants is usually necessary. Control weeds around each plant with hand tools or with herbicides. Cover plants before applying herbicides.

■ Protect all new plantings with temporary single- or double-strand smooth wire fences. Once the planting is well established, the fence can be removed. Without the fence, the planting will be trampled or broken to some degree and may never become established well enough to be maintenance free and function as desired.

■ Expect vandalism and have a plan and funds set aside to restore the loss. When vandalism occurs, you will be able to repair the damage and possibly modify your plan to reduce future damage. Also, if you plan for vandalism and are prepared to deal with it, your project is less vulnerable to unwarranted criticism. Remember, some people fear and/or dislike anything that is not pavement or mowed lawn and will use vandalism as an excuse to eliminate habitat. NOTE THE FOLLOWING:

a) The more adults and children involved in planning and carrying out the plan, the less likely that vandalism will occur and/or the more likely the vandal will be identified.

b) Anticipating vandalism reduces surprise and disappointment when it occurs and makes repair more likely.

c) If funds are set aside to deal with vandalism losses, repair can be accomplished relatively quickly and easily.

Getting Started

■ If you have not already done so, read the previous sections so that you have an idea of what can be done at your school and prepare preliminary counterarguments to the usual objections that you will encounter. Typical invalid objections to properly planned landscaping include higher costs, increased maintenance, increased vandalism, decreased safety and security, etc.

■ Create a preliminary plan. Walk your school grounds and note where plant communities may be created or maintained and enhanced to the benefit of the students, teachers, school and community. Designate specific sites and make a preliminary plan for each site. A list of sites and possible ideas for the sites is sufficient. Remember, this is a preliminary plan that will be much changed by additions, deletions and modifications.

■ Share your plan with a few interested people — teachers, students, parents. Ask these people to be part of the preliminary planning committee. Involve them in modifying the preliminary plan.

Consult with the School Principal

No school yard wildlife habitat project should be undertaken without the support of the principal and the approval of the school district. Start with a meeting where the preliminary planning committee can discuss the project with the school principal. Use your preliminary plan to present the basic idea of what you hope to accomplish, but clearly emphasize that you expect to modify the plan as you gather more information and ideas. The principal can give a broad overview of issues related to the school facility. The discussion might include the following points:

• Future plans by the school district for additional buildings, roads, etc.

• Play fields, parking lots and portable classrooms.

• Routine maintenance program.

• Considerations for neighboring properties.

• Access for students with special needs.

• Safety, risk management and liability issues.

• Potential for funding/in-kind donations from the community, Parent-Teacher Organization (PTO), Partners in Education.

•Benefits to and involvement with the school district.

Inform and Involve Key People

All teachers and all classes should be encouraged to be involved. Students can write ideas or draw them. This will help ensure that natural areas and the wildlife habitat are used regularly and in all curriculum areas. It will be well worth it to take the time to publicize your habitat project to the PTO, the board of education, Partners in Education, neighboring property owners, student clubs and community organizations. Solicit their ideas. Neighbors, for example, may not like the idea of a plant screen between them and the school grounds.

Don't forget to discuss your plans with the school system maintenance department and to apply for any necessary permits from the county or state. Otherwise, your project might get "cleaned up," mowed over or halted.

Form a Planning and Implementation Committee

Involving all interested parties might slow things down, but involving and informing people is one of the reasons (and rewards) for doing the natural area/wildlife habitat project. Once you have everyone's input, however, you will need to create a working committee to plan and implement the habitat project.

Organize the working committee as soon as you have permission to develop the habitat. It should be open to all interested persons and, most importantly, headed by a project coordinator to oversee all committee tasks.

A committee will:

■ Utilize the various backgrounds and talents of the community.

■ Spread the workload.

■ Create a solid foundation and help ensure that the project continues year after year in spite of staff changes and fluctuating interest.

The committee should include:

•The principal, several teachers, interested students, custodians and grounds personnel.

•PTO volunteers and other interested parents and family members.

•Local natural resources professionals and hobbyists.

The working committee should include student representatives and/or student body leaders. Each adult should have a student cooperator. A project like this is a good opportunity to improve students' life skills, and student involvement will build ownership and help reduce problems with vandalism.

The committee positions and responsibilities listed below have provided an effective organization for some wildlife habitat projects. Your habitat committee may have more positions, more than one person sharing some tasks or combined positions. It is important to give volunteers very clear and limited tasks for a specific period of time (e.g., chronicler for one school year only, or even half of the year). Indefinite or vague tasks will wear down volunteers. The use of a computer program such as Master Planner can aid organization.

HABITAT PROJECT LEADERS: Should be effective organizers, have vision, be able to delegate responsibilities and communicate effectively. Responsibilities: oversee development of the habitat plan.

CHRONICLERS: Should be good record keepers and photographers. Responsibilities: document project progress with written descriptions, "before and after" photos, a scrapbook and/or a video journal.

PUBLICISTS: Should be good communicators. Responsibilities: write releases for local newspapers, take photos, create a newsletter or submit articles to the PTO newsletter.

COORDINATORS OF VOLUNTEERS: Should be good organizers, motivators and promoters. Responsibilities: promote volunteer involvement, match volunteers to tasks, coordinate work days, send thank-you's.

BUDGET KEEPERS: Should be good financial record keepers. Responsibilities: maintain receipts, records of donated goods and services and discounts; submit invoices to school bookkeeper or PTO treasurer for payment.

DONATIONS/GRANTS COORDINATORS: Should be good writers. Responsibilities: fund raising, seeking sources of funds and materials, preparing grant proposals, maintaining information for writing reports.

WILDLIFE EDUCATORS: Should be good educators and motivators. Responsibilities: help teachers use the habitat for teaching. Activities can include compiling resources, putting together a file of ideas to be shared, creating a habitat-related bulletin board, scheduling training, maintaining appropriate teaching supplies, etc.

Implementation: Evaluate Your School Ground

Get a copy of the plat (also called plan or map) of the school buildings and grounds from the principal, custodian or school district office. Make multiple copies you can mark on. Also have your preliminary plans available. Contact a natural resources professional or knowledgeable volunteer to walk the grounds with members of your committee. Before you walk the grounds, review the information and ideas you have already accumulated from the principal, custodian, teachers, students, etc., and your map and preliminary plan.

What to note as you walk the grounds:

- Buildings, parking lots, athletic and play fields, bus circles, sidewalks, roads, courts.
- Walls of buildings with few or no doors and windows.
- Location of underground utilities, drains, sewer and septic lines. (Also contact your local power, telephone and municipal water department. Always call MISS DIG before any digging.)
- Open areas needed for snow storage.
- Planned and unofficial patterns of traffic, including cars, buses, bikes, pedestrians, delivery and maintenance vehicles.
- Litter, erosion, drainage problems, mud, bare soil.
- Problems caused by wind, glare, noise or undesirable views.
- Water, lakes, rivers, streams, ponds and wetlands, even those that go dry part of the year. (wet meadows, vernal ponds)
- Portions of grounds not being used, including mowed areas.
- Slopes.
- Future building plans and sites.
- Potential habitat sites suggested in Table 1.
- Existing habitat- -woods, shrub zones, tall grass and wildflowers, wetlands, landscape plants already present.

Evaluate Features

Evaluate good and bad features of each specific site for wildlife habitat and potential outdoor classrooms. Consider:

- Distance from the school building — neither too far from nor too close to classroom windows.
- Access from building to grounds.
- Security of the site.
- Additional benefits to people who use, maintain and own the site.
- Existing features of wildlife habitat.
- Appearance.

Students can help conduct an inventory of existing plants using field guides and assistance from local experts. They can then begin making field guides particular to your habitat using photos or drawings of plants and plant groups.

Make a Plan

Share your plan by marking on your copies of the school grounds map where wildlife habitat can be created, enhanced or protected. On the plan, number and outline each site you select for consideration. If you wish, make one master copy of the school grounds map and cover it with one or more acetate overlays. Each overlay can then be used to indicate site conditions and proposed changes. Use non-permanent markers. On a separate piece of paper, record the following next to each site number:

Vegetation present: _____
(examples: mowed grass, woods with large trees, scattered planted shrubs, wetland shrubs)

Soil type(s) _____
(examples: clay, silt, loam, sand, muck, etc.)

Moisture _____
(examples: wet, well drained, dry)

Light _____
(examples: full sun, partial shade, etc.)

Present use _____
(examples: none other than mowing, refuse dumping, clear view from road, etc.)

Prior use _____
(examples: forest, wetland, farm, old field [note: this may be difficult or impossible to obtain or may be irrelevant because of extensive land change during school construction])

Proposed change _____
(examples: plant trees in windbreak or shrub mass to reduce mowing, develop interpretive trails, discourage trampling and vandalism, etc.)

Methods to be used _____
(examples: mulch, plant and fence; clear trails and cover with wood chips; build boardwalk for access to wetland)

Materials needed _____
(examples: plant materials, weed mat, wood chips, fencing, tools, lumber, etc.)

Resulting benefits _____for_____
(examples: energy savings, reduced mowing, maintenance reduction, habitat improvement [e.g., plant trees or shrubs for nesting birds, small mammals, waterfowl])

Use general terms in completing the above. Do not be specific yet. For example, if you plan to do some planting, next to "proposed change" write, "plant low-growing, spreading deciduous shrubs." Seek professional help when the time comes to be specific.

Also, consider existing problems and how you can eliminate them with more beneficial vegetation. Suppose a diseased crabapple tree has overgrown a heavily used walkway and litters it with crabapples each autumn. More desirable alternatives may be low shrubs that don't spread and/or a tall tree with small leaves and no fruit.

Share Your Plan

Share your preliminary plan with your principal, school board, school maintenance personnel, parent groups, teachers, students, school neighbors and professionals from your local area. Ask for suggestions and changes. Remember, some of the criticisms you get will be very helpful and some will be misinformed. If you have done a good job of planning the right thing in the right place, you will be able to deal factually with misinformed criticism.

Ask the professionals to help make your plans as specific as possible. Specifics include species and varieties of plants, type of mulch, location and length of trails, boardwalks, etc., kinds and amounts of equipment, interpretive materials, etc. Although you have a good general idea of what is needed, professional advice will help you choose the best specific material or practice for your local area. For example, if you have decided you need an evergreen tree that grows in clay for a windbreak, a local professional may recommend white spruce.

A question that always arises is whether to plant native or non-native plants. If native plants are suitable and available, use them. If not, use a closely related horticultural variety that does not create problems by spreading and then dominating a site. For example, horticultural varieties of crabapple are far more resistant to disease and much easier to find than native crabapples. Never use undesirable invasive plants such as purple loosestrife (a wetland flower), buckthorn (an upland shrub) and Siberian elm (an upland tree). If it is not possible to use a native plant or a horticultural variety of a native plant, then use a commercially available plant that does not create problems. Examples are London plane tree, Chinese juniper or cotoneaster.

Local professionals may include retail nursery managers, local builders, contractors and suppliers, landscapers, college professors, university Extension agents, foresters, fish and wildlife biologists, soil scientists, park managers, nature center staff members, city planners and engineers.

Using the input you received after sharing your plan, modify the plan to incorporate the good suggestions and improvements. The result is your master plan. Submit this plan to your principal or school board for final approval. Be prepared to make additional changes to gain approval.

Now is the time for the chroniclers to take pictures of each site where changes will be made. Take several pictures from different viewpoints.

Prioritize, Schedule and Budget

■ Ask local professionals when certain tasks are best done: soil preparation, planting, cutting, fertilizing, etc.

■ Decide which parts of your plan you will implement first. Don't try to do too much at once, but if volunteers, materials and money are available, don't limit what can be done. Remember to delegate as much responsibility as you can to volunteers, teachers and students. The implementation process, like the results and subsequent studies of the improved site, is a learning experience.

■ Make a list of what each project will require in people, know-how, material, tools, equipment, money. Make detailed lists for projects to be done first. Subsequent lists can be improved, especially after the first experience.

■ Schedule when the first project or projects should be started and completed. You may wish to divide a project into sequential tasks, assign each task to an appropriate person or group, and ask them to make a list of requirements — labor, materials and money.

■ Based on your experiences with implementing the first project, prioritize the remaining projects. A multi-year plan will probably be necessary.

■ Remember:

a) Avoid creating problems.

b) Enhance human use and enjoyment

c) Reduce maintenance on the school grounds.

d) Protect projects in the early stages.

e) Plan for vandalism.

Obtaining Materials, Equipment and Funding

Using your list of needs (people, materials and equipment), ask members of your team or teams to inquire throughout your community for volunteers to provide their time, equipment and/or materials.

For example:

- The local utility company or road commission may be delighted to donate wood chips.
- A local farmer may be willing to donate his time and use of his machinery.
- A local contractor may be willing to provide equipment and an operator at little or no cost.
- The local nursery may be willing to donate surplus or damaged but otherwise healthy plant materials.
- Gardening clubs may help with planning, implementation, and donations of materials or funds.
- The local landscaper, forester, wildlife biologist, etc., may help with further planning and implementation.

The more precisely you identify your needs, the more likely you will be able to line up a donor who has the things you need. You may also have to purchase expertise, materials and equipment, or rent equipment. To do so, you must raise some funds.

Important Things To Do:

- Be aware that you can offer donors valuable publicity through school publications and maybe the local media! Let a potential donor know what kind of publicity you can provide in return for support: mention in a newsletter that goes home with students, a sign in the outdoor classroom, a poster in a window of their business, a message on the school's outdoor announcement sign, a flyer sent to students' homes, recognition at a dedication ceremony and mention in any media coverage of events.
- Clearly ask for what you want. A clearly defined and organized list of needed materials and costs is an effective way to get donations. Donors want to see exactly what their money is supporting and may prefer to fund an entire project--such as a boardwalk, windbreak or nature trail--that can be clearly identified as their contribution to the school.
- Always follow through on requests from potential donors and fulfill promises made. Send thank-you's promptly.
- Students can write thank-you notes or make posters to place at businesses that make donations, help conduct fund-raisers, etc. Participating in the fund-raising process teaches important life skills.

Tips for Writing Grant Proposals

The persons designated to write grant proposals need not have experience writing proposals, but they should have strong writing and organizational skills. Writing proposals is nothing more than communicating ideas in a clear and concise way according to guidelines set out by grantors.

Begin developing written information about your project. Creating ready-to-use statements means you will not be overwhelmed when your first grant application arrives in the mail. The following elements are common to most small grant proposals:

- Project purpose/goal: Two or three sentences are enough.
- Project objectives: Be specific. List.
- Justification: Why is this project important? Many justifications are described in this publication.
- Project description: This summary should be organized to reflect the ways in which your project matches the funding objectives of the grantor. Partnerships with individuals, businesses and agencies should be highlighted. Include a list of the activities planned to carry out your project. Show your project is achievable.
- Timeline: Promise only what you can reasonably achieve and be specific. Most grants have deadlines for project completion.
- Budget: A well thought-out line item budget shows that the project is a good investment. The grantor wants to know that funds will be used effectively and exactly in what way. Show that you will be as careful with the grantor's money as you would be with your own. The budget is the true test of whether what you want to do matches what the grantor wants to fund. Some

grants require matching funds or in-kind donations. It is usually easier to match a grant in-kind by adding up donated items such as plants, building materials, snacks for volunteers, office supplies for posters and thank-you's, etc. Any professional who lends expertise to your project, such as a landscape architect, is donating a consultant's fee — have him/her write you a receipt. If a parent offers free use of equipment such as a tiller, estimate what that would have cost you in rental fees. Also include staff and student hours spent on the project. These hours have monetary value as in-kind donations.

■ Evaluation: Include improvements made, the monetary and environmental benefits of the improvements, the educational value of conducting the project and the educational benefits of studying the results of the project.

Let the school community know that you are looking for grants. The best grants to seek are the small, local grants. There will be less competition for these and you are more likely to have personal contact with the grant maker. Do not hesitate to file for larger state or national grants that are well matched to your project, however. The Michigan Department of Natural Resources, the U.S. departments of Agriculture and Interior, the Environmental Protection Agency, and other agencies and foundations distribute many thousands of dollars in grants appropriate to school ground natural area/wildlife habitat projects.

Once you have a grant application in front of you, follow all directions in the application to the letter. Readers of grants usually go through a series of weeding-out steps. The first step often involves screening out applicants who did not follow directions. The application format used by grantors helps them in their review process. Deviating from the format makes a proposal more difficult to read and evaluate. Limit your proposal to the maximum length stated in any proposal application. Make sure your proposal at least gets read.

Pay attention to the language in the grant application package. Highlight and put key wording from the application package right into your proposal. Successful grant writing is really a matchmaking process--grantors have definite objectives and you must convince them that your project fits their needs.

Make a checklist from the grant application package. Make sure you have addressed all points mentioned in the grant application package. For example, if the grantor prefers to fund projects that promote community involvement, express clearly how your project will involve the community. Be sure to address any goal of the grantor set out in the grant application package. Always include an evaluation of your project and specify when the grantor will receive the evaluation(s).

Have several people read your proposal. Your readers should be people not closely involved with or informed about your project. This distance will help them find any gaps or confusing elements in your proposal. Any questions left unanswered by your proposal for your readers will also be unanswered questions for the grant reviewer. Use your readers' comments to make your proposal clearer, easier to read and more comprehensive.

Finally, make sure your proposal is neat and pleasant to read. Look at it objectively. Is it inviting? Have you used spacing and a type size large enough to make reading easy? Have you broken text into small sections with headings or do you have long, unbroken passages that can turn the reader off?

Meet your deadline!

Provide for Continuity

Worthwhile and practical school projects sometimes cease to function because of a change in staff, a change in the community, and/or a change in priorities and resources. A project may be neglected or abandoned because of the change, not because of a conscious and reasoned decision by the people involved. The following suggestions will help ensure that your school's wildlife habitat project is governed by deliberate decisions made by all involved parties.

Ask a local bank if, as a civic contribution, it would be willing to serve as executor of a trust fund for your wildlife habitat project. The planning and implementation committee could then deposit funds, perhaps a small amount (e.g., $100) into the trust fund. (Note: Small amounts are not profitable for the bank. That is why the bank has to agree to serve as executor as a civic contribution to the school project.) As executor, the bank must report on the status of the fund to a board of trustees. The board of trustees should be composed of the school principal, a member of the school board, interested teachers, interested parents and interested students.

At least one of these trustees should be a member of the habitat project's working committee. The board of trustees then decides what to do with the trust fund. For example, it can decide to reinvest the interest on the fund, spend the interest on the habitat project, or discontinue the fund, dispose of the assets and abandon the habitat project. In any event, a deliberate decision will be officially made by interested parties.

Ask a local lawyer if he or she would donate time to help create the trust and the board. The following should be included in the bylaws of the board of trustees:

- All decisions concerning the trust must be made by a majority of all board members.
- The board does not plan or implement wildlife habitat projects; rather, it decides whether trust funds can be expended for habitat purposes.
- The board must meet once a year with a representative of the bank holding the trust.
- Teacher, parent and student members of the board should be elected by participants in the school habitat project.

Using Your Natural Area/Wildlife Habitat for Education

New knowledge is always gained through observation, collecting information, analyzing information and drawing conclusions. The process through which these things are done includes scientific experiment, trial and error, and memorization and imitation. Teachers help their students learn the scientific process and use it to gain new knowledge. Remember, observations can be recorded in numbers, words, pictures, photographs, essays, journals and drawings. These records can then be analyzed, objectively or subjectively, to create hypotheses that can then be tested by the same process of gathering information, analyzing and drawing conclusions. If records are kept over the years, the scientific process and the knowledge gained become more sophisticated.

The following questions can guide teachers in developing students' abilities in observation, information collection and analysis, and drawing conclusions.

- Can landscaping improve property for people? How?
- Can landscaping improve property for wildlife? How?
- Can natural communities (forests, wetlands, meadows) be maintained on school grounds? How?
- What benefits can natural areas provide?
- Does wildlife habitat benefit people? How?
- What kind of wildlife uses what kind of habitat? Why?
- What habitats are not used by what kinds of wildlife? Why?
- When (season of year) does the wildlife use the habitat?
- What does the wildlife use the habitat for (food, cover, water, living space)?
- More specifically, how does the wildlife use the cover (nesting? roosting? water? shelter? etc.) and food (seasonal? adults? juvenile?)?
- Do people benefit from the wildlife? How?
- Do you like the wildlife and its habitat? Which ones do you like and dislike? Why?
- Does the habitat change? How? How fast? Why?
- Can the habitat be managed? How? For what purpose?
- Can landscaping and the management of natural communities on school grounds create and maintain biodiversity on school grounds?
- Should biodiversity be increased on school grounds? Why?

If you have read the previous sections of this project guide, you are aware that this project proposes answers to many of these questions. Are the proposed answers valid, relevant and important to you, your school and your community? One way to find out is to plan a project, evaluate the site prior to treatment, implement it and evaluate it after treatment in subsequent years (see Table 3).

Table 3. Things to evaluate* before and after treatment or by comparison with similar untreated areas.**

What to evaluate	What to measure	Materials and Methods
effectiveness as windbreak	wind speed, air temperature, school heating cost, personal comfort	anemometer (simple model $15) for wind speed in mph or cottonball, tape measure and watch for wind speed in ft/sec (distance and time cottonball takes to drop to ground; use wind speed and local humidity and temperature to calculate wind chill; before and after fuel use or cost
effectiveness as shade	air temperature, school cooling costs, personal comfort	thermometer for site temperature; before and after electricity costs
effectiveness as screen	glare, noise, dust, personal visual appeal	board covered with tape sticky side up to count number of visible dust particles per day; number and duration of bright reflections per hour
effectiveness as erosion and trampling control	area of bare soil, amount of soil lost per year	tape measure for area of bare soil; graduated cylinder to measure sediment in collected runoff water
reduced mowing and leaf and snow removal	area mowed, volume of leaves, snow depth and costs	tape measure to measure reduction in lawn area mowed and volume of leaves not required to be raked; volume of snow not required to be removed or removed by hand shovel
habitat maintenance costs	training and pruning, weed control, replacement, abnormal mowing	visual estimate, e.g., 18 mowings/year vs. 1 trimming/2–5 yrs.
water pollution control	water turbidity	measure sediment in runoff water
wildlife and/or signs seen	animals seen, sounds heard, signs seen (tracks, trails, droppings, food remains, gnawings, burrows, nests, skin, hair, feathers, bones, carcasses)	counts per minute, hour, day, week or month of indicated signs; counts of tracks in 3 ft. x 3 ft. area of bare soil raked to fine consistency or covered with sand; tracks in snow
educational use	number of times used by classrooms, individual study	number of instances observed or reported
recreational use	resting, hiking, observing, photographing	number of instances observed or reported
wildlife use	resting, feeding, hiding, sleeping, breeding	number of instances observed or reported
diversity	numbers of species, communities, community structures — height, density, amount of edge (juxtaposition), communities per area (interspersion)	index by measuring or counting in sample areas
human preferences	opinions, students and public reactions	questionnaires, public meetings, debates, essay contests, art displays, science fairs

*Remember – evaluation can be objective (mph, °F, inches, sq. feet, $$) or subjective (drawings, essays, poems, songs, photographs)

** at 1 year, 2 years, 3 years, 5 years, 10 years, etc.

Local Resources

- County MSU Extension office (in each county).
- Local Michigan Department of Natural Resources offices.
  Forest Management Division—forester.
  Wildlife Division—wildlife biologist.
  Fisheries Division—fisheries biologist.
  Parks and Recreation Division—park ranger or naturalist.
- Local Soil Conservation District office (usually in each county).
- Local U.S. Department of Agriculture Natural Resources Conservation Service office.

  District conservationist (usually in each county).
- Local municipal government (in most counties and cities).

  Parks manager or director.

  Nature center director.
- Local businesses--landscapers, contractors, builders, consulting firms, nurseries, farmers, forest-using industries, utility companies.
- U.S. Department of Agriculture Forest Service offices (National Forest Offices in Ironwood, Escanaba and Cadillac).
- District U.S. Department of Agriculture Forest Service offices (contact through National Forest offices).

  District forest ranger.
- U.S. Department of Interior Fish and Wildlife Service offices (local offices are in Seney, Saginaw and East Lansing).

  Fisheries biologist.

  Wildlife biologist.
- Colleges and universities.

  Faculty members in departments of biology, zoology, fisheries and wildlife, forestry, agriculture, horticulture, soil science, botany, landscape architecture, parks and recreation.
- Local private organizations. Current addresses may be available through local professionals, businesses, agency offices, colleges and universities, biological stations, nature centers, clubs. Many are listed in the Michigan Conservation Directory, available from Michigan United Conservation Clubs, 2101 Wood Street, Lansing, MI 48909; 517-371-1041.

  Michigan Horticultural Society.

  Michigan Chapter of the Wildlife Society.

  Michigan Association of Landscape Architects.

  Michigan Chapter of the Society of American Foresters.

  Michigan Alliance for Environmental and Outdoor Education.

  Michigan Nursery and Landscape Association.

  Michigan Forest Association.

  Michigan Forestry and Park Association.

  Michigan Association of Conservation Districts.

  Michigan United Conservation Clubs.

  Michigan Federation of Garden Clubs.

  Michigan Wildlife Habitat Foundation.

  Michigan Chapter of Soil and Water Conservation Society.

Helpful Literature

Landscaping for Wildlife
Minnesota Bookstore
117 University Avenue
St. Paul, MN 55155
1-800-652-9747
and
Michigan United Conservation Clubs
Lansing, MI 48909
517-371-1041

Woodworking for Wildlife
Minnesota Bookstore
117 University Avenue
St. Paul, MN 55155
1-800-652-9747
and
Michigan United Conservation Clubs
Lansing, MI 48909
517-371-1041

A Guide to Urban Wildlife Management and other urban wildlife publications
National Institute for Urban Wildlife
P.O. Box 3015
Shepherdstown, WV 25443
304-876-6146

A Field Guide to Animal Tracks
by O. J. Muric
Peterson Field Guide Series
Houghton Mifflin Co., Boston

Other field guides to animals and plants
Peterson, Golden, Aububon Society,
Stokes Putnam Nature

Invite Wildlife to Your Backyard
Gardening with Wildlife Kit
Schoolyard Habitats
National Wildlife Federation
Laurel Ridge Conservation Education Center
8925 Leesburg Pike
Vienna, VA 22184-0001
703-790-4000

Shelves, Houses and Feeders for Birds and Mammals
North Central Regional Extension Pub. No. 338
Ag. Bulletin, Room 245
30 N. Murray Street
Madison, WI 53715
608-262-3346

Helping Wildlife –Working with Nature
Wildlife Management Institute
Suite 801, 1101 14th St., N.W.
Washington, DC 20005
202-371-1800

Plants for Play
MIG Communications
1802 5th Street
Berkeley, CA 94710

Project WILD and Project WILD Aquatic (K–12 environmental education guidebooks emphasizing wildlife; available through workshops) and other WILD resources (Wild Sites, Action Guide, School Natural Area Program)
10A Agriculture Hall
Michigan State University
East Lansing, MI 48824

Project Learning Tree (K–12 environmental education guidebook emphasizing trees and forests; available through workshops)
Greening of Detroit
415 Burns Drive
Detroit, MI 48214

School Site Development for Wildlife
Ohio Dept. of Natural Resources
Division of Soil and Water Conservation
E. E. Division
1939 Fountain Sw. Ct., Bldg. 2E
Columbus, Ohio 43224
(616) 265-6878
Fax: (616) 262-2064

Technical and Financial Support

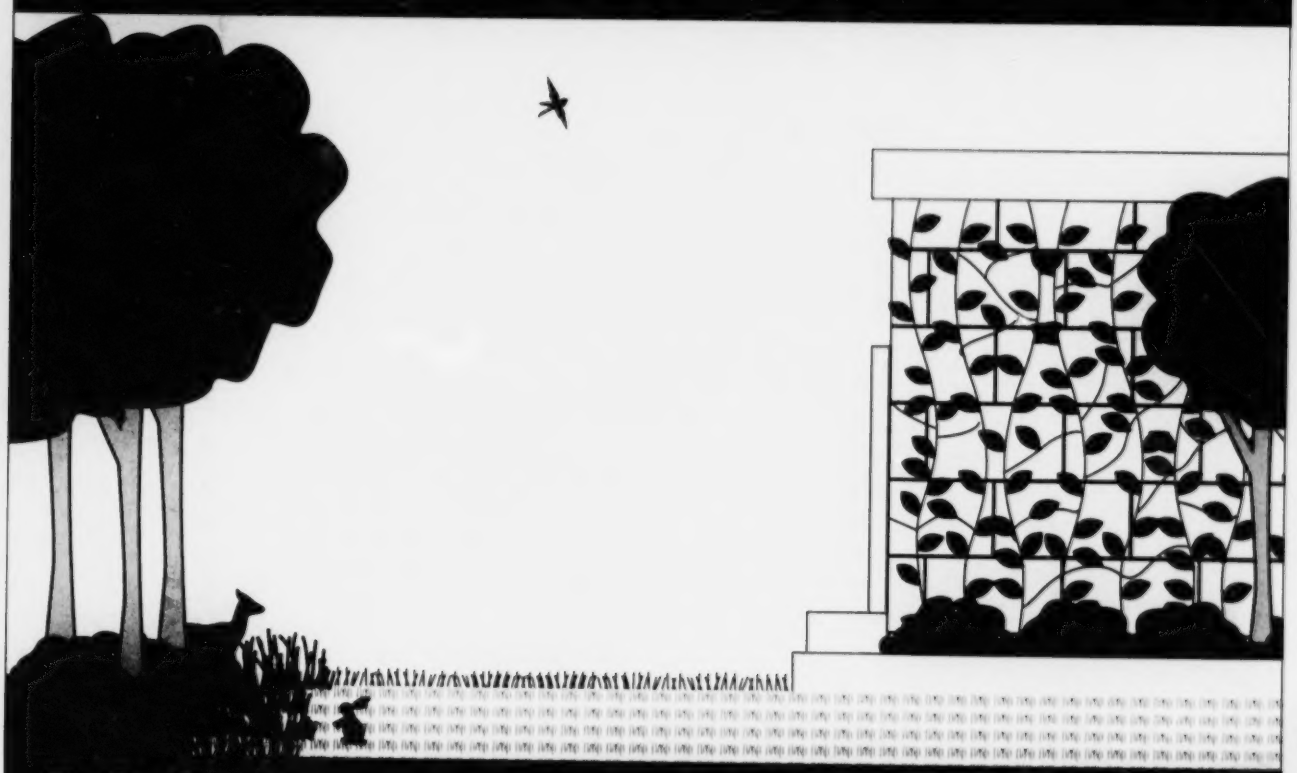
Global Releaf
P.O. Box 9043
Livonia, MI 48151
1-800-642-7353

The Greening of Detroit (Detroit only)
415 Burns Drive
Detroit, MI 48214

The Non-game Program of the Wildlife Division
Michigan Department of Natural Resources
P.O. Box 30028
Lansing, MI 48909

Urban and Community Forestry Program
Michigan Department of Natural Resources
Box 30452
Lansing, MI 48909

SCHOOL GROUND HABITAT



FOR PEOPLE AND WILDLIFE

MICHIGAN STATE EXTENSION

MSU is an Affirmative-Action/Equal-Opportunity Institution. Extension programs and materials are available to all without regard to race, color, national origin, sex, disability, age or religion. ■ Issued in furtherance of Extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Arlen Leholm, interim extension director, Michigan State University, E. Lansing, MI 48824. ■ This information is for educational purposes only. References to commercial products or trade names does not imply endorsement by MSU Extension or bias against those not mentioned. This bulletin becomes public property upon publication and may be printed verbatim with credit to MSU. Reprinting cannot be used to endorse or advertise a commercial product or company.

Produced by Outreach Communications and printed on recycled paper using vegetable-based inks.

New 9:96-3M-LJ/JP, Price $2, for sale only